



ISSN: 0975-833X

Available online at <http://www.journalcra.com>

International Journal of Current Research  
Vol. 11, Issue, 04, pp.2799-2805, April, 2019

DOI: <https://doi.org/10.24941/ijcr.34979.04.2019>

INTERNATIONAL JOURNAL  
OF CURRENT RESEARCH

## RESEARCH ARTICLE

### PHARMACIST LED – STROKE PUBLIC HEALTH AWARENESS

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#### ARTICLE INFO

##### Article History:

Received 20<sup>th</sup> January, 2019

Received in revised form

19<sup>th</sup> February, 2019

Accepted 27<sup>th</sup> March, 2019

Published online 29<sup>th</sup> April, 2019

##### Key Words:

Stroke; health promotion; pharmacist-led patient education.

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#### ABSTRACT

**Introduction:** Stroke is the third highest disease in the United Kingdom to cause death; despite the severity of this healthcare issue, the public are not aware of the main characteristics, treatment and prevention factors involved. **Aim:** This study was conducted at the University of Wolverhampton in November 2018, with the aim to investigate the level of stroke awareness within the local university population. **Method:** This research project included 50 participants which after providing informed consent, carried out the questionnaire to test their general knowledge regarding stroke. The sample ranged from various demographical characteristics such as, gender, age, ethnicity and occupation. The questionnaire comprised of sections which tested knowledge regarding UK stroke statistics, risk factors and causes, stroke treatment, prevention and aftercare. **Results:** From the data collected, the main findings indicated that although there was a satisfactory degree of knowledge about stroke within the study population, there are certain areas which require improvement to ensure all stroke patients and potential sufferers a better chance of recovery. From the demographical analysis, it shows that females and participants in the 18-34years age group scored a higher proportion of correct answers compared to males and the elder generation. **Conclusion:** Overall, further education would be recommended within the community to ensure all the population is able to access information regarding stroke. Factors such as language barriers and various educational programmes for different age groups should be taken into consideration to ensure that public health awareness about this serious disease is made successful.

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**Citation:** Kiran Hussain, Hana Morrissey and Patrick Anthony Ball, 2019. "Pharmacist led – Stroke public health awareness", *International Journal of Current Research*, 11, (04), 2799-2805.

## INTRODUCTION

Stroke is one of the major global factors of the increase in disability, mortality and morbidity. Approximately 10 million people suffer from stroke for the first time, and around 6.5 million people are estimated to die annually due to this neurological condition worldwide. In the United Kingdom, stroke remains one of the largest killers after heart disease and cancer, and the commonest cause of adult disability (Feigin *et al.*, 2015). More than 100,000 people are affected by strokes annually; one stroke every five minutes (Xu *et al.*, 2017). Stroke treatment has been developed and improved over the years, but two thirds of stroke survivors still leave hospital with disability. Stroke causes more disabilities than any other condition, with the most common residual impairments being cognitive impairment, problems with lower limbs and speech difficulties; with estimated frequencies of approximately 33%, 30% and 27% respectively (Stroke Association, 2018). Stroke is defined by the World Health Organisation (2019) as "rapidly developing clinical signs of focal disturbance of cerebral function, lasting more than 24 hours or leading to death, with no apparent cause other than that of vascular origin". The most frequent cause of stroke is interruption of the blood supply to the brain due to the formation of a clot. Less

frequent is the rupture of a blood vessel. Either results in the oxygen and nutrient supply being cut off, causing damage to brain tissue. Ischaemic strokes are around 85% of strokes and haemorrhagic is 15% respectively (Musuka *et al.*, 2015). With the restriction of blood, brain cells deplete vital nutrients. Depending on where the damage occurs, it has different effects on individuals. In ischaemic stroke, the faster reperfusion therapy is initiated, the less damage will result (Dirnagl, Iadecola and Moskowitz, 1999). Rudd (2002) stated that 'stroke should not be regarded as a single healthcare issue;' it is a clinical manifestation of a range of pathologies. The risk factors leading to a first stroke are the same as those precipitating a subsequent stroke. These include hypertension, smoking, age, gender, alcohol consumption, diabetes and ethnicity. Hypertension is a major risk factor; trial data has indicated that reducing blood pressure by 5-6 mm Hg diastolic and 10-12 mm Hg systolic for approximately 2-3 years reduces annual stroke risk from 7% to 4%. Smoking increases stroke risk by 50% and cessation programmes, nicotine replacement supplements, behavioural modification and encouragement from trained healthcare professionals are all effective methods to reduce smoking and its consequences related to stroke (Rudd and Olfe, 2002). Age is risk factors for both cerebral infarction and primary intracerebral haemorrhage; an individual aged

between 75-84 years has a 25-fold increased stroke risk compared to an individual aged 45-55 years. Although males have an increased risk of stroke, a larger number of females will suffer from stroke due to their greater life expectancy. Reducing alcohol consumption can protect against both ischaemic and haemorrhagic strokes. Heavy intake is directly related to risk factors such as hypertension, high cholesterol levels, predisposing atrial fibrillation etc. Reduced intake can have a large impact on the overall risk of both underlying diseases and the risk of stroke. Compared to Caucasians, Afro-Caribbean people have an increased incidence of stroke in the United Kingdom.

This may relate to their increased prevalence and severity of hypertension. Within the UK, people from south Asian populations show higher stroke mortality than Caucasians demonstrated to be related to the increased central obesity, diabetes mellitus and insulin resistance (Markus, 2012). Zhang *et al.*, (2012) reported that stroke mortality is decreasing, showing treatment and rehabilitation of stroke patients has. Nevertheless, 'time is brain' and every effort should be made to reduce the time between presentation and treatment. According to the National Institute for Health and Care Excellence (CG68) (2019), it should commence as early as possible within the first 4.5 hours of onset. Other health care issues which need to be controlled and monitored by professionals to ensure the patients do not have a relapse include hypertension, cholesterol and diabetes control; smoking cessation and nutritional and hydration monitoring.

Dysphagia is a common (60%) stroke complication. Stroke affects the swallowing mechanism at multiple levels due to the interruption of the feedback loop, with recovery depending directly upon cortical recovery (Smithard, 2016). Assessment of swallowing function is a high priority for any stroke patient within 24 hours. Spence reviewed all stroke cases since 2007, and concluded approximately 80% could be prevented with a combination of lifestyle changes and appropriate medication (Spence, 2017). With more recent advances in hypertension, anticoagulation, antiplatelet, nutritional and lipid-lowering therapy; there are chances that stroke recurrence can be further reduced. The target now within the healthcare sector is to identify the cause of the initial event so that therapy can be individualized (Spence, 2017).

## Method and design

### Study Concept Development

Public health awareness programmes assist people to change their attitudes and behaviour through increase in knowledge. Rasura *et al.*, (2013) found that after reviewing current programmes, most interventions proved partially effective in terms of gender preference and the type of information retained. It was found that community-based campaigns (face-to-face and online) are extremely effective when integrated with a comprehensive stroke strategy to expand general knowledge (Rasura *et al.*, (2013). One of the most successful stroke-awareness programmes to date is the FAST national stroke awareness campaign in the UK. In February 2009, the Department of Health in England launched the Face, Arm, Speech and Time (FAST) media campaign, to raise awareness of stroke symptoms and inform the need for emergency response. At phase one assessment of the campaign it was found that there was a significant impact on public behaviour

about stroke, and emergency admissions had also increased. (Flynn *et al.*, 2014).

## Aim

The aim of this project was to assess the extent of stroke awareness and knowledge amongst the University population, staff and students, from varying ethnicities, age, genders and education backgrounds.

## Objectives

### The objectives of this research project were to

- Determine the extent of stroke knowledge amongst the university local population.
- Identify crucial areas of lacking knowledge that need to be improved.
- To provide educational information leaflets to improve the University population awareness regarding stroke.
- Investigate any link between demographical characteristics and stroke knowledge.

## MATERIALS AND METHODS

The method of this research project involved a cross-sectional study in the form of a questionnaire. The questionnaire was distributed to random people (students, lecturers, general staff etc) near the university canteen area. The questionnaire was developed by the researcher (KH) in consultation with the supervisor (HM). It comprised of 20 multiple-choice questions which included demographic and general stroke awareness questions (Appendix A). Questions 1-4 were designed to collect demographic data, including gender, age, ethnicity and occupation. This would allow comparison of the level of understanding and stroke knowledge between varying population groups. The remaining questions (question 5-20), focused on stroke awareness to test existing knowledge; this included general statistical facts, treatment, causes and after-care. The participants were also offered the opportunity to use an online stroke risk calculator to determine their personal level of stroke occurrence. The online tool used in this case was the QStroke ® Risk Calculator (ClinRisk Ltd., 2019). Ethical approval was received from the University Ethics Board before commencing. Participants were provided with a study information sheet, and the questionnaire was provided to those who indicated willingness to take part in the study. In total 50 questionnaires were distributed, all of which were returned fully completed. Following completion, the participants were provided with an information leaflet which was designed specifically for the purpose of raising awareness. The only exclusion criteria were people under the age of 18. All of the responses were reviewed within the data analysis process of the study. The data were analysed through frequency count and percentage. Questions then were further interpreted into percentages to allow the comparison of stroke awareness between demographic characteristics. The software used was Microsoft™ Excel™ 2010.

## RESULTS

There were 42% males and 58% females. There were 56% in the 18-24 age group, 16% in the 25-34 group, 10% in the 35-

44 group, 12% in the 45-54 group and 6% in the 55-64 age group. Out of the 50 participants, 50% were of White/Caucasian ethnicity, 12% were Black/Afro-Caribbean, 18% were Pakistani, 10% were Indian and the remaining 10% were of other ethnical origin (these include Kurdish, Vietnamese and Bangladeshi). Students constituted 54% of the sample, 16% were non-academics, 6% were academics, and 14% were healthcare professionals (pharmacists, doctors, nurses and other allied healthcare professionals). Approximately 10% of the respondents were unemployed, visiting the university. Participants were asked about the recommended weekly alcohol consumption for males and females; 12% of the respondents selected 21 units per week, 50% selected 14 units per week, 25 units per week had a response rate of 12% and 26% answered with 10 units per week. As for exercise, 78% of the sample participants selected that patients should follow a tailored exercise programme after suffering a stroke, and 22% replied that they should focus on resting. Table 1 indicates how many participants were aware of the number of annual stroke cases in the UK (100,000), 18% responded that 15,000 occur in a year, 40% selected 37,500, 8% replied with 9,300 and 34% responded that over 100,000 stroke cases occur in the UK each year. Table 2 shows the responses received amongst the participants for the risk factors associated with stroke; 18% selected smoking, 8% for obesity 14% for diabetes, 10% selected high blood pressure, 6% for poor diet and 44% responded that all the listed risk factors are linked with stroke.

The meaning for the F.A.S.T abbreviation was asked to the questionnaire participants, table 3 shows the collected data. 2% selected that the acronym stood for Fall, Arms, Slow, Time, 96% selected the correct option of Face, Arms, Speech, Time and 2% replied with Face, Ache, Stop, Tired. Participants were asked if stroke classified as a medical emergency; 94% replied with true, 0% selected that the statement was false and 6% responded that it depends on the severity. Which major organ of the body is affected by stroke? Of participants, 26% responded that the heart is the main organ that stroke is related to and 74% selected that the brain is the main organ associated. Participants were given the statement; 'In general, 6 out of 10 young adults are actively engaged in smoking, alcohol abuse and illegal drug use' and were asked if it is true or false; 88% selected true, 2% selected false and 10% were unsure. In question 11, participants were given the following statement 'Alteplase is an injection used as a 'clot-busting' medication (known as thrombolysis)' and were asked when should this medication be administered to patients.

There were 20% of the participants responded that alteplase should be indicated 2 hours after the stroke onset, 76% selected that it should be given as soon as the patient as admitted and the remaining 4% selected that alteplase is administered 6 hours after the stroke onset. Participants were asked if surgery is a treatment option for stroke, 48% responded yes and 52% said no. Table 4 shows the participants responses to which diagnostic tests are important in stroke; 64% selected CT and MRI scans, 16% replied with blood tests, 18% answered swallow tests and the other 2% selected that none of the options were correct. Participants were asked how quickly they should call the ambulance when themselves or someone else experiences stroke symptoms. All the participants selected that 999 (the national emergency number equivalent to mobile 112) should be dialled as soon as possible. Participants were asked to select the correct statement

about the use of aspirin in stroke patients, 20% indicated that aspirin is an antiplatelet medication makes the blood run through the body quicker, 70% selected that it prevents the formation of blood clots, 2% answered that aspirin stops the bleeding in the brain and 8% did not know. The questionnaire respondents were questioned on who is responsible for the aftercare responsibility according to the patients care plan, 40% selected general practitioner, 26% replied that the nurse in charge is responsible, 28% selected the patients' family and 6% replied with social services. They were then asked to select the most common psychological impact of stroke on patients in their opinion. The results were as follows: stress 22%, fear 10%, anxiety 32%, low self-esteem 10% and 26% for depression. The final question was related to the length of the stroke treatment plan for patients; 28% believe it depends on the severity of the stroke, 52% selected that the treatment in life-long, 18% replied it should last for 6 months and 2% replied that the treatment length depends on the patients' needs. The analysed responses were further interpreted to allow comparison of different demographical factors with the level of stroke awareness within these groups. Overall, 62% and 57% of females and males got the overall responses correct regarding stroke awareness respectively. Higher percentage of each age group and ethnicity, answered questions about stroke awareness correct (Figures 1 and 2).

**Table 1. How many stroke cases occur in the UK every year?**

Answers	Responses
15,000	9
37,500	20
9,300	4
Over 100,000	17

**Table 2. Which of the following increases the risk of a stroke occurring?**

Options	Responses
Smoking	9
Obesity	4
Diabetes	7
High blood pressure	5
Poor Diet	3
All	22

**Table 3. The main stroke symptoms can be remembered with the abbreviation F.A.S.T. What does this stand for?**

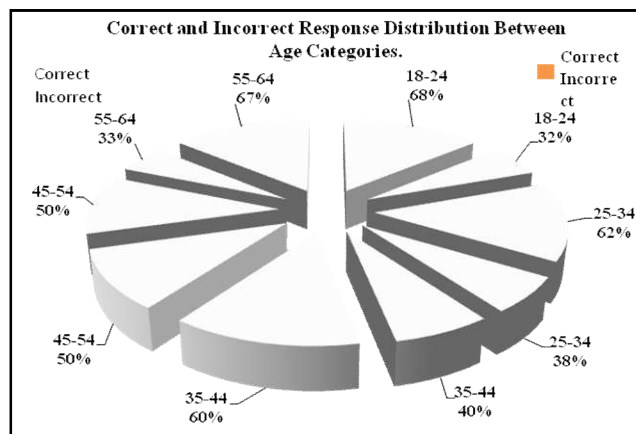
Options	Responses
Fall, Arms, Slow, Time	1
Face, Arms, Speech, Time	48
Face, Ache, Stop, Tired	1

**Table 4. Many diagnostic tests are carried out to confirm the occurrence of a stroke. Select the most important test?**

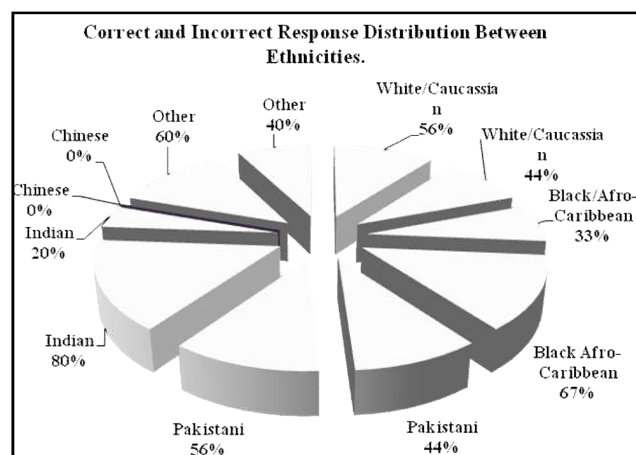
Options	Responses
CT and MRI Scans	32
Blood tests	8
Swallow tests	9
None of the above	1

**Table 5. In your opinion, how quickly should you call the ambulance if you or someone around you is experiencing stroke symptoms?**

Options	Responses
After the patient has calmed down and the symptoms have become less intense	0
Ring 999 as soon as possible	50
There is no need to call an ambulance, the patient just needs rest	0
Call an ambulance 30 minutes after the onset of the symptoms	0



**Figure 1. The distribution of correct and incorrect responses between age categories of the participants**



**Figure 2. The percentage distribution of current and incorrect responses over different ethnicities**

## DISCUSSION

The major findings were that females and the younger generation were more aware of the risk factors and stroke general knowledge. Participants were surveyed on their general knowledge about stroke including statistical facts within the United Kingdom, the causes and risk factors associated, the treatment pathways available and their mechanism of action, aftercare of the stroke patient and the importance of acting as soon as possible to improve treatment outcome. All participants were aware of stroke as a disease; however, 66% could not estimate the correct number of stroke cases occur within the UK annually. All participants were aware of the possible factors which can lead to stroke and 44% of the respondents selected all listed options (smoking, obesity, diabetes, high blood pressure and poor diet). The ACT FAST campaign was an area which scored highest correct answers by 96% of all participants. There was also high correct response rate for the effect of illicit drug use in increasing the stroke risk in the younger generation (88% answered correctly).

The main topic which was highlighted as the key area in which the participants lacked knowledge was stroke treatment and aftercare (questions 11-20 within the questionnaire). Question eleven focussed on thrombolysis and when the medication should be administered, the responses received varied within the participants (24% were unsure whether administration should be before or after the patient reaches hospital). Also, for

question twelve, 52% of the participants selected 'no' as their response for surgery being an option for stroke treatment. Menon *et al.*, (2014) also found that response towards stroke treatment and prevention was the area which indicated the least amount of knowledge within the participants of the study. Only 2 subjects responded that lifelong treatment is required for stroke patients; also 50% of the participants were completely unaware of the duration of treatment. Further analysis of the results showed that a quarter of all responses indicated that participants felt that stroke treatment needed to continue for weeks to a few months and 8% responded that treatment lasts for 2 years. As well as this, over 50% of the study participants were unaware that stroke is a disease which is preventable if risk factors are controlled. On the other hand, 100% of the responses indicated that emergency medical help is needed as soon as possible when someone is experiencing any stroke symptoms (question 14). Participants were aware that patients should follow a tailored exercise regimen to improve their strength, mental health and quality of life after suffering from a stroke (78%), and that stroke patients require ongoing lifetime support and treatment (52%). Another demographical factor identified was ethnicity and how stroke awareness differed between different backgrounds. The Indian population had the highest percentage of correct responses overall at 80%, followed by 'other' ethnicities (Bangladeshi, Vietnamese and Kurdish) responding correctly at 60%, White/Caucasian at 56%, Pakistani at 44% and Afro-Caribbean with the least correct responses at 33%. The socioeconomic level effect on stroke knowledge was investigated by Ramírez-Moreno *et al.*, (2016). The objective of this study was to analyse the sociodemographic factors which influence the degree of stroke knowledge within the public. It was found that 59% of the female population responded adequately to the stroke awareness survey, in comparison to 41% of males. This study also found that participants with an age range of less than 65 had an 88.3% increased stroke knowledge level, whereas the population over 65 only had 11.7%. Another study which provides evidence that there is a variation within stroke knowledge amongst demographical characteristics was conducted by Yang *et al.*, (2014).

The results obtained from Yang *et al.*, (2014) regarding knowledge of stroke symptoms and treatment among community residents found that out of 1101 respondents, females had a higher response rate compared to males. Also, the age range 18-36 showed a higher level of stroke awareness, whereas the participants with the age range higher than 75 were less aware of stroke symptoms (Yang *et al.*, 2014). In relation to ethnicity, a review was conducted by Gardois *et al.*, (2014) which identified that in accordance to stroke awareness, different ethnic groups had a varying level of knowledge in comparison to Caucasians. It was found that ethnic minorities experience barriers to accessing health services which can affect their public health awareness. These barriers include cultural, religious and social interventions. Therefore, key factors such as perception of health and illness, language barriers and available community resources can have a large impact on stroke awareness within the minority groups living in different countries. The study concluded that it is highly important that stroke awareness programmes are improved at aiming and addressing ethnic all groups within the UK, as the degree of stroke knowledge within the Black/Afro-Caribbean's was relatively poor.

**Limitations:** The results obtained from this research project illustrate that there is a level of satisfactory stroke awareness within the university local population; however this may not be representative to the general local population. Additionally the data was collected over 10 hours in one day which may not represent the staff and students who were not on campus at that day. The study sample was small (n=50), if a larger sample size was used then more accurate values would have been collected with a smaller margin of error. For example, if a participant population size of 100-200 was used within the project, a more valid and reliable conclusion could be made regarding the level of stroke awareness within the general public; as a wider range of demographical individuals (age, gender, ethnicity and occupation) will be involved. Another limitation involved with this research project is that no participants took part in the online stroke risk calculation. This was mainly due to the length of time it takes to complete and most participants were either in their break or moving between classes.

Although this was not possible at the time, it would be considered as main intervention future research.

### Conclusion and Recommendations

In conclusion, the results suggest that basic stroke knowledge within the university local population is of a satisfactory level. However, understanding treatment was identified as an area which requires further awareness and education to ensure stroke treatment commence earlier to improve patients clinical outcome. The main demographical characteristics which showed a large distribution in stroke awareness levels were ethnicity and age; the Indian and Caucasian ethnic groups, and the 18-24 and 25-34 age groups attained a higher proportion of correct responses in comparison to other demographical factors. Further awareness programmes and strategy should be developed to target the older population and the Black/Afro-Caribbean's to close the gap in knowledge and improve the entire population health outcomes.

### Appendix 1

**Questionnaire: Raising Awareness on Stroke and Cardiovascular Risk Calculation Within the General Public.**

Please ✓ as appropriate:

- What is your gender?
  - ☐ Male
  - ☐ Female
- Which of the following categories describes your age?
  - ☐ Younger than 18
  - ☐ 18-24
  - ☐ 25-34
  - ☐ 35-44
  - ☐ 45-54
  - ☐ 55-64
  - ☐ 65 or older
- Which ethnic group do you belong to?
  - ☐ White/Caucasian
  - ☐ Black/Afro-Caribbean
  - ☐ Pakistani
  - ☐ Indian
  - ☐ Chinese
  - ☐ If other, please state:
- What is your occupation? Please state below:
- How many stroke cases occur in the UK every year?
  - ☐ 12,000
  - ☐ 37,500
  - ☐ 9,900
  - ☒ Over 100,000
- Which of the following increases the risk of a stroke occurring?
  - ☒ Smoking
  - ☒ Obesity
  - ☒ Diabetes
  - ☒ High blood pressure
  - ☒ Poor diet
- The main stroke symptoms can be remembered with the abbreviation F.A.S.T. What does this stand for?
  - ☐ Face, Arms, Slow, Time
  - ☒ Face, Arms, Speech, Time
  - ☐ Face, Ache, Stop, Tired
- A stroke is classed as a medical emergency and urgent treatment is required?
  - ☒ True
  - ☐ False
  - ☐ Depends on the severity of the symptoms
- A stroke is caused by a lack of oxygen and nutrients to a certain part of the human body, resulting in cell death. Which major organ of the body is a stroke related to?
  - ☐ The heart
  - ☒ The brain
- In general, 6 out of 10 young adults are actively engaged in smoking, alcohol abuse and illegal drug use. Do you think this can increase the risk of stroke for young adults?
  - ☒ Yes
  - ☐ No
  - ☐ Unsure

There are two main types of a stroke: ischaemic and haemorrhagic. The following questions (11-15) relate to the diagnosis and different types of treatments available.

- Alteplase is an injection used as a 'clot-busting' medication known as thrombolysis. When should this medication be administered to patients?
  - ☐ 2 hours after the stroke onset
  - ☒ As soon as the patient is admitted into hospital
  - ☐ 6 hours after the onset of the stroke
- Is surgery an option for stroke treatment?
  - ☒ Yes
  - ☐ No
- Many diagnostic tests are carried out to confirm the occurrence of a stroke. Select the most important test from the list below.
  - ☒ CT and MRI Scans
  - ☐ Blood tests
  - ☐ Swallow tests
  - ☐ None of the above
- In your opinion, how quickly should you call the ambulance if you or someone around you is experiencing stroke symptoms?
  - ☐ After the patient has calmed down and the symptoms have become less intense
  - ☒ Ring 999 as soon as possible
  - ☐ There is no need to call an ambulance, the patient just needs rest
  - ☐ Call an ambulance 30 minutes after the onset of the symptoms
- Aspirin is an antiplatelet medication which 'thins blood'. Select the most appropriate statement below regarding the use of aspirin for the treatment of stroke.
  - ☐ It makes the blood run through the body quicker
  - ☒ Prevents the formation of blood clots to reduce long-term risks of patients' having another stroke in the future
  - ☐ Stops the bleeding in the brain
- Stroke can cause widespread and long-lasting problems, requiring long-term support for patients. If on-going care is required after discharge, who is responsible for checking the patients care plan?
  - ☐ General Practitioner
  - ☐ The nurse in charge
  - ☐ Patients' family/carers
  - ☒ Social services
- Which of the following is the most common psychological impact on patients who have suffered a stroke?
  - ☐ Stress
  - ☐ Fear
  - ☐ Anxiety
  - ☐ Low self-esteem
  - ☒ Depression
- Excessive alcohol consumption can lead to high blood pressure which significantly increases the risk of having a stroke. What is the recommended limit for both men and women for the consumption of alcohol a week?
  - ☐ 21 units a week
  - ☒ 14 units a week
  - ☐ 25 units a week
  - ☐ 10 units a week
- Stroke is a neurological disorder which can cause disability. After suffering a stroke, patients' who do not exercise can experience feeling lethargic and depressed. From the list below, select the option which you feel is most appropriate.
  - ☒ Patients should follow a tailored exercise regimen to improve their muscle strength, mental health and quality of life
  - ☐ Patients should focus on resting after suffering a stroke, their body will take time to heal and will happen over time without any personal rehabilitation
- How long should stroke treatment continue for?
  - ☐ Depends on how serious the stroke is
  - ☒ Stroke patients require ongoing lifetime treatment
  - ☐ Patients should take their medication as directed for 6 months until their health is reviewed by a doctor
  - ☐ The treatment length depends on how long the patient feels they need the medication for

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